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East Europe Report

SCIENTIFIC AFFAIRS

No. 670

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CONTENTS

INTERNATIONAL AFFAIRS

Computer Applications Council Convened in Budapest
(Zsuzsu Orendi; SZAMITASTECHNIKA, Feb 80) 1

Soviet Planning Office Official Discusses Computer Cooperation
(R.L. Ashastyin Interview; SZAMITASTECHNIKA, Feb 80) 4

GERMAN DEMOCRATIC REPUBLIC

Scientific Cooperation with USSR Outlined
(Claus Grote; PRESSE-INFORMATIONEN, 22 Feb 80) 7

HUNGARY

Results, Prospects of Chemical, Biochemical Research on Foodstuffs Protein
(Radomir Lasztity; ELELMEZESI IPAR, No 12, 1979) 10

Minister Interviewed on Computer Industry
(Istvan Soltesz Interview; SZAMITASTECHNIKA, Feb 80) 23

Operating Principles of ES 2 Series
(Ferenc Gemes; SZAMITASTECHNIKA, Feb 80) 35

Deficiencies of Czech Typewriter Lead to Development of New Matrix Console
(Peter Molnar et al; SZAMITASTECHNIKA, Feb 80) 39

CONTENTS (Continued) Page

Ryad, Mini-Ryad Line Printers Discussed
(Peter Keszthelyi; SZAMITASTECHNIKA, Feb 80) 43

Abstracts
Electronics and Electrical Engineering 46

ROMANIA

Activity of Marine Research Institute Described
(Virgil Iordanescu Interview; FLACARA,
21 Feb 80) 48

INTERNATIONAL AFFAIRS

COMPUTER APPLICATIONS COUNCIL CONVENED IN BUDAPEST

Budapest SZAMITASTECHNIKA in Hungarian Feb 80 p 1

[Article by Zsuzsa Orendi, of the National Computer Technology Applications Office of the Central Statistical Office: "Applications Council for Computer Technology Devices Convened in Budapest"]

[Text] The Applications Council for Computer Technology Devices (SZEAT), which works within the framework of the Inter-Government Computer Technology Committee, recently held its fourth session in Budapest. The session was presided over by N. I. Cheshenko and was participated in by delegations from Bulgaria, Hungary, the GDR, Cuba, Poland, Romania, the Soviet Union and Czechoslovakia, at the deputy minister level. The Hungarian delegation was led by Lajos Pesti, vice-chairman of the Central Statistical Office. After a detailed report on the work done in the past year the session refined the operational plan for 1980, debated the SZEAT plan for the years 1981-1985 and determined the chief directions to be worked for international cooperation in computer technology applications up to 1990. In the area of computer technology applications the task of special importance in the years ahead will be an improvement in and computer support for the technology of software development, which will result in a significant improvement in the efficiency of program design and programming work. In addition, special attention must be devoted to the problems of training computer technology experts and to the development of common training principles, materials and methods. In the interest of solving these tasks the SZEAT created a Temporary Work Group for Software Technology which will work for the realization of goals set forth by the SZEAT, in conjunction with the Methodology Section and the Temporary Work Group for Automated Technology Process Control. In the interest of mutual transfer and wide use of developments prepared as part of international cooperation progress was made in the development of an appropriate interest system and procedure pertaining to the exchange and transfer of software products. The Hungarian delegation at the session strove primarily to have the SZEAT concentrate on the chief questions of international cooperation. Several of the foreign delegations used the occasion to become acquainted with Hungarian computer technology institutions such as SZAMOK [the International Computer Technology Instruction and Information Center], SZAMKI [the Computer Technology Research

Institute], the NOTO OSZV [National Computer Technology Enterprise] and the MTA [Hungarian Academy of Sciences] SZTAKI [Computer Technology and Automation Research Institute].

During the 10 years of its existence the Inter-Government Computer Technology Committee (SZKB) has devoted significant attention to tasks connected with computer technology applications. In the beginning the execution of tasks to be solved as part of international cooperation was coordinated by the Work Group for Automated Control Systems and the Work Group for Automated Technical Planning. At the end of 1976, on the basis of a resolution of the SZKB, the Applications Council for Computer Technology Devices was formed by combining these two work groups. With the creation of the SZEAT the participation of the several countries rose to a higher level because the common work extended to the most essential areas of applications. The basic task of the SZEAT is to realize a uniform technical policy and to coordinate the forces of the member countries in the area of the application of computer technology devices.

In accordance with this the SZEAT:

--designates those most important areas of the national economies of the countries where the application of computer technology devices will result in the greatest economic efficiency,

--participates in the preparation and development of forecasts and long-range plans for computer technology applications,

--prepares and employs model systems, applications program packages and standardized solutions and follows the testing of these through a referral system of the developing country,

--develops automated system design methods with the aid of appropriate tools,

--develops orienting methodological materials which regulate the volume and content of model systems, standardized solutions and user programs to be realized within the framework of the SZKB,

--on the basis of a consideration and analysis of user requirements, works out technical requirements for hardware and software tools, and

--prepares recommendations as to the method of exchanging model systems and applications program packages approved by the SZKB.

The work of the SZEAT takes place on the basis of a Uniform Cooperation Plan (EET) approved by the Inter-Government Computer Technology Committee.

Since 1979 the tasks of the Hungarian national group of the SZEAT have been carried out by the Computer Technology Applications Council (SZAT), the members of which are representatives of ministries or organs with national authority which guide significant computer technology applications areas or which are involved in major questions affecting computer technology applications (for example, organization development, technical or scientific research or education, etc.).

The SZEAT [sic] compiles recommendations and prepares coordinated stands in basic questions of national developmental policy for computer technology applications (medium and long-rage planning, the development of complex inter-branch applications systems, determining the chief trends of expert supply, standardization and methodological activity, etc.). In addition to this activity it provides domestic coordination of tasks undertaken as part of international cooperation. The tasks of the SZAT are aided by six work groups which discover and propose solutions for problems at the enterprise, state administrative, process control, technical design, methodological and software supply levels. These work groups also carry out the Hungarian part of the tasks of the working organs of the SZEAT.

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SOVIET PLANNING OFFICE OFFICIAL DISCUSSES COMPUTER COOPERATION

Budapest SZAMITASTECHNIKA in Hungarian Feb 80 p 3

[Interview with R. L. Ashastyin, leader of the Economic Council of the Inter-Government Computer Technology Committee and a main department chief in the planning office of the Soviet Union]

[Text] [Question] When was the Economic Council formed and what are its most important tasks?

[Answer] The SZKB [Inter-Government Computer Technology Committee] passed a resolution concerning the establishment of the Economic Council in 1973, in the fifth year of the cooperation, when the need to regulate economic questions arose together with the first technical achievements.

The most important tasks are the following. To organize that work which stands before the planning organs of the member countries of the SZKB in carrying out the coordination of computer technology economic plans. Preparing an appropriate and coordinated chapter for multilateral integration measures to be worked out within the frameworks of CEMA. Preparation of the multilateral specialization and cooperation agreement for computer technology development and manufacture. The further perfection of work done in the area of planning including the preparation of economic forecasts and solving problems of cooperation in SZKB foreign trade.

[Question] In what sort of organization does the Council carry out its tasks or rather what institutions represent the member countries in the several work organs?

[Answer] The Economic Council has two sections, one dealing with planning questions and one dealing with foreign trade questions. Representatives of planning organs, technical development committees, academic institutes, the ministries of foreign trade and the ministries responsible for computer technology manufacture participate in the work of every national group of the Council.

[Question] Perhaps the most significant task of the Economic Council is the preparation of the multilateral international specialization and cooperation agreement. Could you please summarize how you view the significance of this agreement, or rather what you consider to be its most characteristic aspects?

[Answer] It is the task of the agreement now being prepared to resolve for the long term the mutually advantageous expansion and deepening of developmental and manufacturing specialization and cooperation for computer technology tools and to aid the achievement of a higher technical level in the manufacture and utilization of computer technology tools, increasing economic efficiency in the several member countries. During the 10 years of the cooperation carried out within the framework of the SZKB thus far a certain scientific and manufacturing potential has developed in every member country which we take into consideration when deciding on specialization. At the same time we determine in regard to every country a list of products the development and manufacture of which will bring maximum advantages to both the manufacturer and the user. Specialization begins with the preparation of these lists of computer technology tools and ends with the delivery of the tools to the countries not specializing in them. The appropriate articles of the agreement in question and the contacts among our countries, based on equality and friendship, ensure the realization of the interests of the specializing countries and of those not specializing. A supplement to the agreement sets down in an obligatory fashion the volumes of mutual deliveries of the computer technology tools constituting the object of specialization.

[Question] How does the section made up of experts dealing with planning questions contribute to the coordination of the computer technology plans of the central planning organs?

[Answer] The section made up of experts dealing with planning questions does preparatory work for the proper conduct of computer technology economic plan coordination; in addition, it prepares materials for the coordinated plan for multilateral integration measures.

[Question] What is the substance, at this time, of the perfection of planning activity in the SZKB?

[Answer] The Economic Council has determined the basic goals, content and organization of work to be done in the area of combined planning. It is our opinion that the documents of combined planning will make it possible, in the period of plan preparation, to better prepare a coordinated plan for multilateral integration measures and the integration chapters of the national economic plans of the member countries. By using uniform forms and indexes a comparative analysis can be made of information coming from the several countries, variants can be calculated in the course of preparing proposals connected with specialization by the several countries and we can determine the lists of technical tools to be developed.

[Question] What connection is there between the forecast preparation done within the framework of the Economic Council and the forecasts of a computer technology or technical nature prepared in the Scientific and Technical Cooperation Committee of CEMA? What are the most essential trends reflected in the forecasts of the Economic Council which must be taken into consideration in the development of future cooperation within the SZKB?

[Answer] One form of the cooperation of the member countries taking part in the agreement--working out forecasts for the development and use of computer technology tools--serves the goal of defining the most rational, optimal solutions at the attainment of which we must aim in the interest of a better utilization of various resources in the area of multilateral specialization and cooperation activity pertaining to computer technology tools.

It is the basic task of the economic forecast to measure the growth trends of demand for computer technology tools, structural changes therein and the rate and ratios of growth and provide a quantitative estimate in regard to both total needs and the demand for various functional groups of products by area and form of use and the degree to which these needs can be expected to be satisfied. The forecasting of economic considerations to be realized in the area of the development and use of computer technology tools takes into consideration the technical-scientific forecasts worked out within the framework of the Scientific and Technical Cooperation Committee of CEMA, which is to say that these CEMA forecasts are reflected in the economic ones.

[Question] What sort of questions are addressed by the multilateral cooperation taking place in the foreign trade section of the Economic Council and what concrete results have we achieved in this area?

[Answer] The work of the section dealing with foreign trade questions is directed primarily at compiling orientation price guidelines for the hardware and software products being developed and a uniform (orienting) base price list for computer technology tools.

This work aids various organs of the countries participating in the agreement in a better orientation in foreign trade questions and it aids in defining specialization by the several countries.

Solving the problems connected with the coordinated introduction of our products in socialist and capitalist countries also represents a work area for the section dealing with foreign trade questions.

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GERMAN DEMOCRATIC REPUBLIC

SCIENTIFIC COOPERATION WITH USSR OUTLINED

East Berlin PRESSE-INFORMATIONEN in German No 23, 22 Feb 80 p 2

[Article by Prof DSc Claus Grote, secretary general, GDR Academy of Sciences: "Fruitful Cooperation With the USSR"]

[Text] Science and technology have great tasks to fulfill in the formation of the developed socialist society in the GDR. In this context, close cooperation between the GDR Academy of Sciences and its partners in the USSR and other socialist countries is characteristic. Thus, in the course of the 1976-1980 Five-Year-Plan, international cooperation in research with the USSR Academy of Sciences and other scientific institutions of the Soviet Union was systematically continued on the basis of existing arrangements, agreements and protocols.

Promotion of the Solution of National Tasks

The extent of cooperation, that is the quantitative aspect of our joint activity, has essentially remained the same during this year. However, from the standpoint of its content, it was possible to attain a perceptible concentration in such--for scientific-technical progress decisive--areas as the optimization of the fuel-energy complex, solid state physics and material research, scientific instrument building, automation of scientific experiments, computer technology, microelectronics, laser-controlled nuclear fusion, pyrolysis of hydrocarbons and genetics. To some extent, the result has contributed considerably to the solution of national research tasks.

For example, joint investigations in solid state physics on the phase transition metal-insulator and to the conductivity in the transition metal chalcogenides in the Physico-Technical Institute in Leningrad led to a new material for optoelectronics, which can be used, among other things, in holography, pulse technology, interferometrics, for holographic data processing, the visualization and diagnosis of infrared and high-frequency laser beams, as well as for displays, for example for example for large advertising boards.

Work conducted in close cooperation with Soviet partners in the area of the biosciences, too, led to a rapid growth in understanding. While until the beginning of the 1970s molecular biology merely described the processes of heredity and the expression of heredity information on the molecular plane, a new situation has developed now. Molecular biology, in conjunction with the "art of genetic engineering," has created the experimental and theoretical preconditions which today already enable the bioscientist within limits to intervene directly in the genetic material of living beings.

The new knowledge in molecular biology is already being used in a variety of ways, among other things to find new diagnostic processes for medicine, new biochemicals for research and practical purposes, to develop new vaccines against viruses and other pathogenic agents, or to create new microorganisms and fungi for the production of hormones, antibiotics, specific proteins (for example enzymes) and for the production of biomass for animal nutrition.

Joint Prize of Both Academies

In 1979 the cooperation culminated in the first-time award of the joint prize of the GDR and the USSR Academies of Sciences for the best work originated in this way. Three collectives received it for research in the area of semiconductor injection lasers, the pyrolysis of hydrocarbons, as well as the elementary processes of plasticity and fracture.

Cooperation of the social scientists of both academies, too, has continued to develop in the current five-year-plan. A clear concentration on joint research on pressing problems of the developed socialist society and the altercation with anticommunist social theories can be registered.

The exchange of scientists with the Soviet Union has become a commonplace feature of our work. In 1955 10 scientists belonging to our academy visited the USSR; at that time we received 2 from corresponding partner institutions in the course of an entire year. In 1979, however, at any given time there were 1,691 scientists from the GDR Academy of Sciences and 1,045 from the Soviet Union who were guests in the friendly country.

At the present time the point is to prepare the new five-year-plan correctly. Stronger cooperation on the plane of the direction of both academies must be regarded as an important factor in the further intensification of relations. It affects such questions as the longterm development of basic research, the transfer of research results into practice and the creation of development potentials. In this respect, too, the first steps have been taken.

In a number of areas the degree of the division of labor and readiness to oblige is to be further intensified in order to attain greater intensity in research work and the more rapid transfer of jointly achieved results into social practice. This point of view and measures to increase the effectiveness of cooperation stand to the fore in the elaboration of proposals for the plan of cooperation during the period 1981-1985. Thus we act entirely in accordance with the 11th Session of the SED Central Committee when we promote these decisive directions of development on which the scientific and technical possibilities and the investment capacity of the republic are focused. At the meeting of presidium members of both academies to take place this year, consultations will be held concerning the results of the current five-year-plan and the tasks during the 1981-1985 period, the new subject plan for bilateral cooperation will be voted on and signed.

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RESULTS, PROSPECTS OF CHEMICAL, BIOCHEMICAL RESEARCH ON FOODSTUFFS PROTEIN

Budapest ELELMEZESI IPAR in Hungarian No 12, 1979 pp 444-448

[Article by Radomir Lasztity: "Status and Results of Chemical and Bio-Chemical Research on Foodstuffs Protein"]

[Text] Summary

The main target of food protein research activities includes the elucidation of the structure of proteins and their amino acid composition, of the textural enzymes, of the changes in proteins during storage and processing, of new protein sources and the questions of protein analysis. Hungarian food protein research--having obtained noteworthy results in numerous fields--was broadly characterized by these trends also. In this summary the author reports the results of the last 10-15 years and the directions of prospective development.

Food and fodder supply problems, many of whose implications will be discussed in this article, are generally common knowledge today. Thus it is understandable that within foodstuffs research throughout the world protein research is most significant. In Hungarian national and department level research programs, protein research likewise occupies a predominant position. If we analyze the research being carried out throughout the world, or rather, Hungarian research, basically the following subject areas may be highlighted:

--study of the fraction distribution, structure and amino acid composition of proteins occurring in foodstuffs,

--study of the textural enzymes of the raw materials of foodstuffs,

--study of the relationships among protein quantity, quality and technological properties,

--study of protein alteration occurring in processing and storage,

--the study of the biological and nutritional values of new protein sources and protein foodstuffs,

--study of the analytical questions related to the protein determination of foodstuffs.

In this study I have endeavored partly to summarize the most important foreign and domestic achievements of the last 10-15 years, and partly to outline the prospective development trends. In this effort I utilized the data received in reply to MTA [Hungarian Academy of Sciences] Foodstuffs Protein Chemistry Working Committee's questionnaire from various research places, information derived from direct, or rather, from other sources and naturally the research results published in the professional literature.

1 Fractional Distribution, Structure and Amino Acid Composition of Proteins Occurring in Foodstuffs

As a result of increasingly broader utilization of modern protein study methods and the increase in research capabilities, it can generally be stated that our knowledge of all foodstufs proteins has increased tremendously. While 20-25 years ago we knew only a few protein fractions of individual foods, today we have succeeded in isolating large numbers of protein fractions in every case. Progress is also significant in the area of structure analysis, and we also have considerable data about the amino acid components of proteins.

In viewing overall food protein research, it is apparent that the study of animal origin food proteins has been and currently still is ahead of the study of plant proteins. It is sufficient to mention that the discovery of the primary structure of the first plant protein occurred in 1967 (citrochromate C, isolated from wheat germ, and ferrodoxin from spinach). In the protein sequence atlas published in 1972, there appeared 230 animal and 6 plant proteins. The relative backwardness of plant protein research can be traced to a number of factors. It is generally more difficult to extract and isolate plant proteins in the pure state, and the monetary resources dedicated to their study and to their research capacities are smaller. The intensive study of many animal origin proteins (e.g., hemoglobin) was not conducted primarily for food science purposes.

Among plant proteins, the study of grain, and more specifically, wheat proteins has received the most attention. As a result, we have succeeded in isolating more than 100 protein fractions of wheat, and also know the complete structure of many of these proteins. The focal point of Hungarian protein research is wheat protein research. As a result of the pioneer work of Kosutany and Vuk, the Biochemical and Food Technology (previously Food Chemistry) Department of the Budapest Technical University [BME] is the chief base for wheat protein research. Achievements of even international recognition have taken place especially in the studies of composition and structure of gluten proteins, and of aggregated wheat proteins. Many summarizing articles provide outlines of these.(1,2,3) The researches of the Grain Trust Research Institute, the Food Industry College (Szeged) and the Baking Industry Research Institute are significant in this area. Wheat improvement and production oriented research work is continuing to broaden (Grain Production Research Institute, Martonvasar Agricultural Research Institute, the Plant Production Department of the Keszthely Agricultural Science University). The latter's chief areas of interest are in studies of strain and agrotechnical factors which influence the protein yield, the fraction distribution and amino acid composition of wheat.(4,5,6)

The newer, very promising direction of wheat protein research lies in the study of the genetic relationships of protein fraction distribution, and in the isolation and identification of wheat gluten fractions.(7,8) The successful conclusion of these researches could reveal the molecular biological relationships among improvement, production and technological properties. It could provide answers to such questions as to what degree baking industry quality is determined genetically, and to what degree it depends on agrotechnical factors. It could also assist in the definitive solution to the protein quantity-quality problem. In this regard, the complex research program which is being developed with the support of the Grain Trust, and in which university researchers, improvers, producers and consumers will participate together, provides the hope that these important researches will be successfully concluded in Hungary in a relatively short time. In all likelihood, the observations can be successfully used in the studies of other kinds of grain.

The study of the proteins of other kinds of grain (corn, rye, barley, triticale, rice) is receiving less attention. Improvers (Martonvasar Agricultural Research Institute, Grain Production Research Institute) and animal breeders (Animal Husbandry Research Institute) have been the ones primarily occupied with the study of the protein quantity and amino acid composition of most of the corn grown in Hungary.(9,10,11,12) However, the more intensive study of corn protein fractions is still in its initial stages. The thesis work of the Biochemical and Food Technology Department of BME and certain accomplishments of the Grain Trust Research Institute are a few which are noteworthy. Considering the great national economy importance of corn, the further development of corn protein related research, and the endeavors directed towards the complex processing and utilization of corn appear to be singularly justified.

The focal point of research in oil bearing seeds, and specifically the proteins of soy and sunflower seeds has been redirected to prepare and exploit protein concentrates, in order to insure a protein supply for new direct food uses. For this reason, I shall deal with this problem in more detail in the fifth chapter. In that chapter, I shall summarize certain problems related to research in leafy proteins.

The development of food science in recent years has made it clear that more intensive knowledge of fruit and vegetable proteins (amino acids, peptides) is not only of interest from the strictly scientific standpoint, but also that its practical significance cannot be neglected. Thus, for, example, while it is clear that the role of fruit and vegetables in the population's protein supply is hardly the deciding one, the importance of the proteins and free amino acids of certain vegetables should not be underestimated from the standpoint of appropriate amino acid supply. We are continuing to acquire a more detailed knowledge of the role of proteins and amino acids in enzyme and non-enzyme browning processes. In sugar manufacturing, the increase in molasses proportion which causes so many problems, and the increasing corrosion which takes place during distillation are likewise related to the non-protein nitrogen components of the raw material. If we add to this as important a problem as fruit ripening, to which area natural enzyme inhibitors can be related, then the importance of further studying fruit and vegetable proteins can be clearly discerned.

Among vegetables the proteins of the potato have received the most intense study. Its amino acid composition, as well as its biological value have been determined. Moreover, the free amino acids of other vegetables have also been studies.(13)

According to the general discoveries in fruit proteins, the relatively small protein content is exceptionally heterogeneous because of its functional biological role (enzyme proteins, regulators, etc). This explains why their more intensive study was made possible only by the spread of newer isolation techniques.

Hungarian studies which provided much interesting data have primarily extended to amino acid studies.(13)

From among domestic studies of grape proteins, I am singling out the research of the Grape and Wine Research Institute,(14) which have explored the proteins of various grapes and wines through gel electrophoresis.

In the study of animal proteins in countries throughout the world, significant accomplishments, about which many summary works have appeared, have been achieved in the studies of milk and meat proteins.(15,16) The discovery of the structure of the casein complex and the isolation of certain protein complexes have been achieved as a result of milk protein research. The exploration of their primary structure, for the most part, has been completed. Even more important is the determination that the heterogeneity of the casein fractures can be traced to a genetic basis, since within individual fractions a number of genetic variations, depending upon the species, can be found. The portion of domestic research in milk proteins related to this chapter, and conducted at the Hungarian Milk Production Experimental Institute, has been concentrated on the factors determining milk protein content, and on rapid protein determination.(17,18) The fractioning of milk proteins and the study of genetic protein variations have received little attention.

Among the meat proteins, the studies of the structures of myosin and of several other proteins which have a role in muscle operation have resulted in many new successes. How the molecular aggregates are built up has been clarified, and the explanation of the full sequence of components is close at hand.(19) Although the research is not conducted for food industry purposes, the results have brought to light much new knowledge which will be applicable in the development of meat industry technology.

The newer results in the study of the protein structures of connective tissues (collagen, keratin, elastin) are of interest from the general protein chemistry standpoint. These studies proved conclusively that among peptide chains there can be covalent bonds other than the disulfide bonds.

The Hungarian meat protein research, which is conducted primarily in the National Meat Industry Research Institute, belongs chiefly with matters of technology which I shall summarize in chapter three.

Noteworthy in Hungarian microbiological protein research are the studies of the Central Food Industry Research Institute, the Alcohol Industry Research Institute and BME Biochemical and Food Technology Department in the protein content and amino acid composition of yeasts. In addition, the research in fungus proteins (BME Biochemical and Food Technology Department, Vegetable Production Research Institute) is also to be noted.

2. Study of the Textural Enzymes of Food Industry Raw Materials

The key role of textural enzymes in processes (e.g., aeration, enzyme browning, dough maturing and rising) which are rather important from a technological standpoint have vigorously increased the amount of research in this direction. In our country, within the framework of CEMA cooperation, a longer range research program in the food industry usage of enzymes was initiated. KEKI [Central Research Institute of the Food Industry] coordinated this research, and the widest range of studies are still being conducted in this institution. There have been many summarizing lectures given, and many summarizing articles prepared.(20,21) Significant results have come to light, primarily in the research in the pectin dissolving enzymes, polyphenyloxidases and peroxidases. Summaries and monographs(22,23,24) discuss the accomplishments of the high level theoretical (discovery of the structure and active centers of enzymes) and practical (beer manufacturing without malt) research conducted by the BME Agricultural Chemistry Technology Department in the areas of amylaceous biosynthesis and the enzymes of decomposition.

From among the plant textural enzyme researches the wide ranging studies of fungus enzymes (BME Biochemical and Food Technology Department), the results achieved in wheat amylase (Food Chemistry Department Group of the Horticultural University) and protease studies (BME Biochemical and Food Technology Department, Baking Industry Research Institute, Food Industry

College Szeged) are to be mentioned. The latter could assist in the development of baking industry technology, and in the refinement of wheat classification.

Certain enzymes of animal origin raw materials (reducing enzymes, phosphateses) are being studied primarily from a milk classification standpoint. The curdling enzyme, or rather, research in microbe origin milk curdling enzymes are closely related to cheese producing technology, and thus will be treated in the fourth chapter.

The enzyme changes which take place in meat after slaughter largely determine the meat's technological properties, or rather, value. Thus the continually more thorough knowledge and research of meat enzymes is by all means justified. The first domestic steps have been taken in this area. The earlier research, which was restricted to the study of meat tenderizing enzymes, has currently expanded to the more complete exploration of the post mortem changes in meat. This research, which is being conducted primarily in the National Meat Industry Research Institute, will be discussed in chapter four.

3. The Relationships Among Quantity, Quality and Technological Value

The subject indicated in the heading emerged most definitively in wheat classification. The greatest volume of professional literature is in this area. The research is generally in two directions: one is the search for a molecular level explanation for qualitative relationships; the other endeavors to simplify the classification (inspection) system and to increase its reliability.

Noteworthy among Hungarian research is the work aimed at the exploration of the relationship between chemical structure of gluten proteins and their reological properties.(1) Also noteworthy are the efforts to study gluten quality and quantity as a preparation for qualitative wheat inspection.

The matter of corn protein content and quality and its relation to its utilization value is less developed. I am here considering not only the relationship between the protein content--lysine content--and the fodder value, but also matters such as protein quality--the mechanical properties of the kernel, the amylase manufacturing technology--and complex processing for amylaceous and protein preparations, etc. The study of these and other problems in the future appears to be justified.

4. Changes in Proteins During Processing and Storage

Research to discover the mechanism of the change indicated in the heading has been stimulated by efforts primarily to reduce losses due to storage, to develop and automate continuous techniques and to further accelerate technological processes.

From among the worldwide research to explore the changes which take place in proteins as a result of processing and of the mechanisms of these processes, the following chief directions may be highlighted:

--the biochemical changes of meat after slaughter,

--the study of the Maillard type reactions which take place in protein content foodstuffs,

--the exploration of the mechanism of fermentation milk curdling.

The three directions just mentioned can also be found in our domestic research. The study of the changes of myoglobin, which gives meat its characteristic color, has been carried on for some time. As a result of research conducted by the National Meat Industry Research Institute, and more recently by KEKI, numerous problems related to the preparation of cured meat products have been solved, or rather, can assist the development of the technology. The timeliness of this research has been reinforced by certain concerns which have arisen regarding the usage of nitrates, or rather, nitrites.

According to the professional literature, in recent years there has been considerable attention turned to quality degrading biochemical changes which sometimes take place during the aging of meat. The most significant of these is the problem of exudative meats. In exudative pork (this characteristic has not been observed in other meats) the muscle texture is noticeably pale in color, very crumbly in substance (soft) and its weight loss in cooking is greater than average. According to the estimates of American researchers, the losses stemming from exudative meat in the United States is several hundred million dollars annually. Earlier Briskey(25) and more recently Casseus and his colleagues(26) provide detailed reviews of the research in this problem area.

In analyzing the causes of biochemical differences discerned between normal and exudative meats, some of the researchers are attributing the abnormal behavior of the meat to the effects of stress before slaughter, while according to others, the proclivity for the development of exudative tendencies can be attributed to genetic equilibrium balances in the hormone system. One of the most important tasks of further research is the resolution of this problem. In the current stage, however, a great help would be the development of a rapid, reliable biochemical test to detect the exudative tendency before slaughter.

In Hungary the researchers of the National Meat Industry Research Institute are conducting studies in this area.(27,28,29) The importance and intricacy of this complex problem are justifying the development of a larger complex research program. Its accomplishments would not only contribute to the solution of the occasional problem caused by exudative meat, but also the acquired biochemical information could hopefully be profitable towards the clarification of certain manufacturing, or rather, product development problems.

Within the dairy industry, cheese manufacturing is characteristically the technology in the process of which protein alteration is significant. The study of these alterations is the traditional research subject of the Hungarian Dairy Industry Experimental Institute. This subject area is of current interest, on the one hand, because of the changes which have occurred in cheese making technology (continuous processes, ultra-filtration cheese production), and on the other hand, by the endeavors to replace the traditional curdling enzymes with mold based fermentation products. The fact that the latter products, based on KEKI research, are available and can be industrially produced aid in this endeavor.(30,31) According to more recent research data,(20) the fungus based fermentation product, under appropriate technological procedures, makes the preparation of impeccable quality cheeses possible.

The more recent flourishing of research in the protein-carbohydrate mutual effect based Maillard reaction is primarily the result of the rebirth of the manufacture of dehydrated products and concentrates. Also contributory, however, were the elevated quality requirements and the problems related to the condemnation for health reasons of certain chemicals which appeared during heat treatment.

In recent years the researchers of BME Biochemical and Food Industry Department and the National Institute of Feeding and Nutrition have conducted the broadest range of research in Hungary. They studied the alterations of lysine, tryptophan and the sulphur containing amino acids partly through modeling, and partly through technological experiments.(32,33)

The results of these researches greatly contributed to the more exact determination of the biological values of certain heat treated foodstuffs, and to the more favorable development of certain technological processes (drying, thickening).

5. New Protein Sources, the Biological Value of Food Proteins

The research directed towards the increase of protein supplies and the exploration of new protein sources is rather wide ranging. Numerous Hungarian language summaries about this matter have appeared, among others, in the columns of this journal.(34,35,36) Although in practice nearly every food industry research institute is involved in research related to the subject matter indicated in the heading, still primarily the work of the OMFB [National Technical Development Committee] Protein Program Office and KEKI on the new protein sources which would be avaiable very soon and be directly usable for human consumption, may be noted. These researches are primarily directed toward the exploitation of soy and sunflower seed proteins.(37) The manufacture of a hydrolyzed special milk protein for use in food preparation has been partially resolved.(20) In regard to food, the research directed toward the utilization of yeast is to be mentioned. The exploitation of the plastein reaction, with the aid of which essential amino acids can be built into the basic polypeptides, and with the bonding of which varying molecular weight and propertied products can be prepared, is a potential method of preparing food protein with specified characteristics.

Through the "VEPEX" process, which was developed by the BME Agricultural Chemistry Technology Department, and is industrially implemented, high protein content and biologically valuable concentrates are prepared from green plant parts. Summaries of this process have appeared in several places. (22,38)

The work related to the preparation of protein products from meat and milk by-products is also to be mentioned.

On the whole it is apparent that the laboratory and semi-plant (in some cases, plant) experimental level, the preparation of numerous new protein sources has been resolved. The subsequent goal is the search for the best solution which would most economically exploit both imported and domestically available proteins. The better coordination of research work is necessary for this. One of the important factors in subsequent work is the more exact determination of the biological value of proteins.

The research of the past period, in which Hungarian researchers (OETI [National Institute of Food and Nutrition], AKI [Automation Research Institute], OTEF [expansion unknown]) played important roles, requires significant modifications in outlook on essential amino acids, or rather, on the nutritional value of proteins. The new views are partially related to the biosynthesis and transformation of certain amino acids, and partially are based on a large number of biological (animal feeding, nutritional) experiments. On the one hand, it can be established that there is no sharp distinction between essential and nonessential amino acids. On the other hand, the mutual effects of various amino acids can be demonstrated. Thus, for example, experimental animals (chickens) develop on feed which is lacking in valine, leucine and isoleucine if they receive doses of branching carbon chain fatty acids. Arginine, cystine, glycine, phenylaline, tryptophan and tyrosine can be considered indispensable or not, depending on the quantity of precursor available.

In the field of biological value determination, performed on the basis of chemical indexes, the researchers of BME Biochemical and Food Technology Department, with MEM [Ministry of Agriculture and Food Industry] support, carried on research. Their work in its final refinement is making the optimization of fodder and food implementations possible through an amino acid analyzer data bank--computer--network. In order to provide a practical trial of the procedure, operational experiments are being conducted in conjunction with the Godollo Small Animal Breeding Research Institute. In addition, numerous institutes are working on biological experiments (KEKI, OETI, the Agricultural College of Kaposvar, etc).

The Animal Husbandry Research Institute's research in fodder is the broadest ranging, extending from the evaluation of protein content fodders to the determination of the amino acid needs of domestic animals.

6. Analytical Problems Related to Food Proteins

Worldwide and domestic research on the determination of proteins occurring in foodstuffs is proceeding basically in two chief directions:

--the development of new, rapid protein determination procedures,

--the automation and direct interlinking of analytical procedures through computers.

In recent years, domestic research has achieved significant results in both areas. Numerous rapid processes (based on accelerated Kjeldahl dye bonding, spectrophotometric) have been worked out (BME Biochemical and Food Technology Department, Szeged Food Industry College, Dairy Industry Trust, or rather, Dairy Farm Experimental Institute, MEVI [expansion unknown]). Several automatic protein determination methods have been developed, or rather, adapted (BME Biochemical and Food Industry Department, KEKI, BME Agricultural Chemistry Technology Department, Winery Research Institute, etc) and installed into industrial practice (LACTA Nutrient Factory, Papa Meat Complex). Certain institutes also worked on problems of the nondestructive, rapid method of protein determination with infrared technology (Grain Production Research Institute, BCR [expansion unknown]). We are happy with the cooperation which has developed among those working in this subject area.

The implementation of a sufficiently exact amino acid analysis is a rather important matter, from the analytical standpoint. Unfortunately, the available older amino acid composition data is in many cases incomplete or unreliable. Thus, the creation of appropriate, reliable data through systematic effort would appear to be justified. Similarly, domestic research has dealt with the methodological problems of amino acid determination. The researchers of BME Biochemical and Food Technology Department, Animal Husbandry Research Institute and the Kaposvar Agricultural College, among others, have published related results. The goals of the research were, on the one side, to develop the accuracy of automatic analysis measurements, and on the other side, to make simpler and cheaper measurement appropriate for individual amino acid study possible.

BIBLIOGRAPHY

1. Lasztity, R., "A siker Kemiai szerkezete es reologiai [sic] sajatsagai kozotti osszefuggesek. A kemia ujabb eredmenyei." [The Relationships Between the Chemical Structure and the Reological Properties of Gluten. The Chemistry's More Recent Results.] Vol 2, Budapest, Akademiai Kiado, 1972.

2. Lasztity, R., "Recent Results in the Cereal Proteins Research." PERIODICA POLYTECHNICA.

3. Lasztity, R., Bekes, F., Nedelkovits, J., Varga, J., "The Study of the Aggregated Proteins of Wheat." SUTOIPAR, Vol 25, Nos 87-93, 1978.

4. Nehez, R., "Several Regularities in the Accumulation of Organic Materials in Cereal Grains." AGRARTUDOMANYI KOZLEMENYEK, 30, 229, 1971.

5. Gaspar, I., "Problems of Laboratory Selection in the Improvement of Cereal Strains." AGRARTUDOMANYI KOZLEMENYEK, 29, 291, 1970.

6. Ragasits, I., Candidate Dissertation, Keszthely, 1979.

7. Konzak, C. F., "Genetic Control of the Content, Aminoacid Composition and Processing Properties of Proteins in Wheat." ADVANCES IN GENETICS, Vol 19, p 409, New York, Academic Press, 1977.

8. Szozinov, A. A., "Metodika Vertikaljnogo Diszkogovo Elektroforeza i Geneticseszkij Princip Klasszifikaciji Gladianov." Trudu, VNIIGSZ, Odessa, 1978.

9. Gabonatemesztesi Kutato Intezet. "Hazai hibrid kukoricafajtak minosege 1973-1975." [The Quality of Hungarian Hybrid Corn Strains 1973-1975.]

10. Nemeth, J., Szel, S., Notheiss, F. Mrs., Nehez, R., "The Improvement of Corn Kernel Content Through Selection." NOVENTERMELES, 25, 325, 1976.

11. Gundel, J., Kiss, J., "Economical Evaluation of Various Protein and Lysine Content Corn Types." TUDOMANY ES MEZOGAZDASAG, 4, 1974, 38.

12. "The Present Status and the Future of Corn," in the series, "Novelty Today, Common Practice Tomorrow," edited by Andor Balint, Mezogazdasagi Kiado, 1977.

13. Lindner, K., Doctoral Dissertation, Budapest, 1966.

14. Molnar, I., "Studies in the Nature of the Soluble Proteins of Grapes and Wine." SZOLESZET ES BORASZAT, Vol I, 1975, pp 303-335.

15. McKenzie, H. A., "Milk Proteins I-II." New York, Academic Press, 1970, 1971.

16. Lasztity, R., Torley, D., "Valogatott feezetek [as published] az elelmiszerkemiabol." [Selected Chapters from Food Chemistry] Budapest, Tankonyvkiado, (in process).

17. Uzonyi, Gy., Mrs., Tako, E., "Comparative Study of the Protein Content of Milk from Samples of Pedigreed Cows." TEJIPAR, 19 (3), 62, 1979.

18. Uzonyi, Gy., Mrs., Nagy, I., "Study of the Milk Composition of Transplanted Canadian Holstein-Friz and Dutch Black-White and Red-White Lowland Cows." TEJIPAR, Vol 24, No 4, 1975, p 47.

19. Balint, M., "Az izommukodes molekularis alapja." [The Molecular Basis for Muscle Operation.] Budapest, Medicina Konyvkiado, 1978.

20. Vigyazo, L., Mrs. Vamos, "Biochemical Researches at KEKI's Enzymology Division." Hungarian Biochemical Society Congress, VIII, 22, 1979.

21. Vigyazo, L., Mrs. Vamos, "The Textural Enzymes and their Significance." ELELMISZERVIZSGALATI KOZLEMENYEK (in process)

22. Hollo, J., "Our Bioengineering Research in the Light of the Millennial I-III" ELELMEZESI IPAR, Vol 31, 1977, pp 281-321 and 361.

23. Hoschke, A., Candidate Dissertation, 1978.

24. Hollo, J., Laszlo, E., Hoschke, A., "Plant a 1-4 Glucan Phosphorylases." Budapest, Akademiai Kiado, 1971.

25. Briskey, E. J., "Etiological State and Associated Properties of Pale, Soft, Exudative Procine Musculature." ADV IN FOOD RES, 13, 97, 1964.

26. Cassens, R. G. Proc. XVIII. Eur. Meeting of Meat Research Workers, 1972.

27. Kormendy, L., "Biochemical Changes During Meat Aging." HUSIPAR, 3, 145, 1971.

28. Kovacs, M., Mrs. Vada, "More Recent Facts About Exudative (PSE) Pork." HUSIPAR, 24, 224, 1975.

29. Varvizi, V., Thesis work, BME-OHKI, 1977.

30. Ketting, F., Babella, Gy., Jancso, I., "Studies on Rennet Coagulation of Milk Concentrates Produced by Ultrafiltration." Proceedings of the 20th International Milk Industry Congress, 1978.

31. Vigyazo, L., Mrs Vamos, "Prospects for the Manufacturing and Utilization of Enzyme Products in the Food Industry." ELELMIZESI IPAR, 28, 225, 1974.

32. Dworschak, E., Orsi, F., "The Formation of Amino Acid Derivatives through Alkaline Treatment of Food Proteins." ELELMISZERVIZSGALATI KOZLEMENYEK, 24, 104, 1978.

33. Orsi, F., Dworschak, E., "Study into the Maillard Reaction Occurring Between Methionine and Tryptophane on the One Hand and Glucose on the Other I-II." ACTA ALIMENTARIA, 7, 41, 1978.

34. Kralovanszky, U. P., "The Protein Problem," in the series: "Novelty Today, Common Practice Tomorrow," Mezogazdasagi Kiado, 1975.

35. Simek, F., "Preparation of Proteins through Fermentation." ELELMIZESI IPAR, 28, 2, 1974.

36. Karpati, Gy., Varsanyi, E., "Certain Problems in the Preparation of Highly Nutritional Food Industry Products." ELELMEZESI IPAR, Vol 30, 46, 1976.

37. Demeczky, M., Szigeti, Zs., "The Preparation of Food Protein Concentrates and Isolates from Oleiferous Seeds." ELELMEZESI IPAR, 29, 7, 1975.

38. Nyeste, L., Hollo, J., Veress, A., Szigeti, L., Kurucz, I., Pungor, E., "Fermentation Systems Controlled by Mini Computer and a Short Review of the Hungarian VEPEX Process In: Rotenburger Symposiums Fermentationstechnik," p 141, Meisunger, Gutenberg Verlag, 1978.

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MINISTER INTERVIEWED ON COMPUTER INDUSTRY

Budapest SZAMITASTECHNIKA in Hungarian Feb 80 pp 8-9

[Interview with Istvan Soltesz, minister of metallurgy and the machine industry, concerning organization and the application and manufacture of computer technology devices]

> [Text] The metallurgical and machine industry produces about 40 percent of the gross production value of industry. Thus the organizational and computer technology activity of the ministry and of the enterprises belonging to it merit special attention for the position taken by the KGM [Ministry of Metallurgy and the Machine Industry] in national organizational and computer technology programs is of a determinate character.
>
> At the same time the development and manufacture of Hungarian computer technology devices--which belongs in the sphere of tasks of KGM enterprises--can significantly influence the general level of our computer technology applications. All this inspired our editors to turn with the following questions to Istvan Soltesz, minister of metallurgy and the machine industry. --The Editors

[Question] How do you view the meaning and chief tasks of enterprise organizational work and computer technology application amidst the national economic requirements for thrift with energy and live work and for improving the foreign trade terms of trade?

[Answer] Thrift with energy and live work and improving the foreign trade terms of trade are important national economic goals which must have a stressed role even in enterprise planning work, taking into consideration the enterprise characteristics. Achieving the goals in the plans, discovering and using reserves and improving the several management indexes is possible only with high level organizational work which must embrace the enterprise as a whole. Computer technology, as a tool primarily linked with organization, has a leading role in the modern storage of information, the swift retrieval and processing thereof and in the swift and efficient supplying of information to the various levels of leadership. The swift reaction of the enterprises is of increased significance at this time.

Turning in more detail to the chief tasks standing before organization, these are, in my opinion, the following:

--First place must be given to increasing planning, providing a proper foundation, and to a development of the system of planning.

--Within this, and in the interest of increasing productivity, increased attention must be turned to a development of the auxilliary and supplementary processes connected with the chief processes; there are still great reserves here and the results achieved thus far in exploiting them are not satisfactory.

--Increasing economical, non-ruble accounting export is an important national economic goal. Of the innumerable organizational aspects of this I might stress the more efficient organization of marketing activity and organizational work linked to the development of and beginning the manufacture of exportable, modern products.

--In connection with the intensive and selective development policy we should develop a uniform system of enterprise import management as part of the material supply process, in interdependence with planning, ordering and use.

--An organization of the planning and control processes for export-import activity--ensuring intervention if necessary--could contribute to a large degree from the organization side to improving the terms of trade.

--Operational and work organization activity has strengthened in recent years; the level of this must be raised further, primarily in the area of place of work organization in parallel with a spread of the performance requirement system.

--Speaking of computer technology, it must be stressed that applications should always be subordinated to organizational goals because it is a tool of organization so its role is secondary. An increase in efficiency must be ensured by more effective enterprise and operational organization preparatory work.

--By using computer technology we must reach a degree of development where the emphasis is on efficient decision preparation and providing the antecedent information as opposed to the practice found in many places thus far of a registrative role which simply follows events after the fact.

[Question] What is the ministry doing on the side of central control and guidance so that organization and computer technology applications should contribute to plan fulfillment in accordance with the intentions?

[Answer] A number of tasks fall on the ministry also in the interest of seeing that organization and computer technology applications increasingly aid the achievement of our plan goals. Of these I might stress the following:

--improving branch economic guidance, strengthening coordination, organization and supervision,

--a modernization of the system of enterprise links and of operational and organizational conditions, improving enterprise cooperation,

--strengthening the link between national economic and enterprise planning and a better planned coordination of the work of the enterprises,

--a coordination of enterprise organization and the application of computer technology,

--making the work of base institutes more effective, increasingly bringing them into concrete enterprise organizational work,

--ensuring the development and broad use of standardized computer technology systems, and

--developing the training and further training of organizational experts in the area of the ministry.

[Question] The metallurgical and machine industry is not only the biggest user but also the biggest manufacturer of computer technology devices. How do you intend to encourage domestic manufacture, which shows significant results, to maintain the level and increase it further? In what do you see the cause of the fact that the supply of programs for computers of domestic manufacture lags behind the needs of the users?

[Answer] I would like to note first of all that it is primarily the market--including the foreign market--which encourages or rather forces the domestic manufacture of computer technology devices to maintain and further increase the level. In the present plan period more than 80 percent of the computer technology devices of domestic manufacture are being sold on foreign markets, primarily to socialist countries. Modern computer technology devices are ceasing to be shortage items in most socialist countries. It follows that the socialist countries--as users--are making increasing demands of the products made in Hungary.

The KGM is dealing in a stressed way with a solution of the developmental tasks which increase the technical level. In cooperation with the OMFB [National Technical Development Committee] it is guiding, and supporting to a large degree with central technical development funds, a swift realization of the most important tasks--in accordance with our possibilities. These tasks appear in the Special Computer Technology Research Program.

Continuing to give special importance to the development of computer technology, we have recommended that it be stressed in the National Medium Range Research and Development Plan. Thus, in the next 5-year plan, the research and development tasks aimed at the development of modern versions of small computer systems, storages, printers, display equipment and remote data processing devices will appear as stressed tasks.

Manufacturing technology determines to a large degree the technical level of computer technology devices and the efficiency of production. The developmental problems of the manufacturing technology for computer technology devices are inseparable from the development of the manufacturing technology of the domestic electronic industry as a whole. So, in the course of planning, the ministry deals with the developmental and manufacturing problems of devices working on electronic principles on the basis of a uniform approach. In the interest of increasing the modern character and competitiveness of our electronic devices we are now preparing plans for the development of every phase of manufacturing technology, using a system view and on an industrial scale.

The supply of programs for computers of domestic manufacture lags behind the needs of the users to only a very small degree. A large part of the Videoton computers go to socialist export, primarily to the Soviet Union. They use our computers in a few definite areas (energy distribution centers, marshalling yards, geophysical research, nuclear energy, etc.). We can satisfy the program supply needs of our customers in these areas.

But in addition to the above one of our stressed goals is to further increase the supply of programs for computer systems of domestic manufacture. In the interest of a more intensive development of user programs the OMFB, the KGM and the KSH [Central Statistical Office] are working together on more efficient solutions. At the same time, it is clear to everyone that the development of user programs is the task not primarily of the manufacturer but rather of organization institutes, software houses and, sometimes, of industrial or academic institutes. At the same time, we attribute great significance to the cooperation developing among users within the framework of the Inter-Government Computer Technology Committee, which is expected to make a solution of program supply more rational and more economical.

[Question] The comrade minister is the chairman of the CEMA Permanent Committee for the Radio Technology and Electronics Industry. What are the tasks of this committee and of the member countries participating in it in the manufacture of electronic parts which are so important for computer technology?

[Answer] The task of the CEMA Permanent Committee for the Radio Technology and Electronics Industry is the multilateral international coordination of the most important areas of the electronic industry. Unification of the various themes takes place in eight sections.

The tasks of the eight sections of the Committee are:

--to survey needs and examine prospective areas,
--scientific research,
--working out standards,
--development and initiating manufacture, and
--multilateral specialization and the coordination of manufacturing cooperation.

In certain stressed areas there are committees which examine the unique problems of the parts needs for a given branch. For example, within the framework of the Inter-Government Computer Technology Committee there is a Temporary Work Group for the Microelectronic Element Base which collects, systematizes and harmonizes the needs of the member countries and makes proposals to the REAB [CEMA Permanent Committee for the Radio Technology and Electronics Industry] for the solution of development and manufacturing problems. As a result of surveys, harmonization and development done over the years the parts base for the ESZR-MSZER [Uniform Computer Technology System and Mini-Computer System] now extends to more than 400 types of integrated circuits which are either being manufactured or the development of which will be completed in the near future within the framework of the REAB.

The multilateral cooperation provides a good framework for the exchange of information and the long-range international development of the electronic industry. It is especially useful to our homeland because some of the socialist countries have already made significant progress in the development of their own electronic industries.

The tasks of the CEMA member countries in parts manufacture come into being essentially in th accustomed manner for CEMA cooperation. After processing the questions referred to them by the Inter-Government Computer Technology Committee the REAB and its committees make proposals for cooperation. These become the concrete tasks of the several member countries by virture of bilateral and multilateral specialization agreements.

[Question] The system view has been adopted in technical practice also and this increases our world market competitiveness in the export of complex machines and equipment and complete factories. The intellectual work appearing in organization and in computer technology can constitute a significant fraction of the value of a product. Are there efforts in the enterprises of the KGM to increase such intellectual export and how does the ministry intend to encourage the development of this?

[Answer] An effort to more completely satisfy the needs of the customers is a worldwide trend. Experience proves that we can greatly improve the efficiency of investments if a firm uniting the planning, execution and prime contractor functions undertakes the complete task, embracing a larger industrial installation as a whole.

In the already mentioned socialist cooperation, for example, the countries participating in the various work organs of the CEMA Permanent Committee for the Radio Technology and Electronics Industry and of the Inter-Government Computer Technology Committee give stressed treatment to the question of specialization aimed at mutual deliveries. Complete equipment today contains significant electronic components, including automatic, computer technology components. This today is a basic condition for effective use and marketability.

In complete computer technology systems also there is a significant proportion of intellectual work being marketed on both the domestic and export markets. Increasing the proportion of intellectual work in products is the common interest of manufacturer and user because in both areas this is an important factor for increasing efficiency. It is thus understandable that the ministry and its enterprises--taking into consideration these demands of both domestic and export markets--in harmony with bilateral and multilateral international cooperation are striving to increase the complexity and the intellectual work fraction of equipment and systems. Such products include the complete user systems based on the small computers manufactured by the Videoton Electronics Enterprise (the R-10, R-11, R-12, R-15, SZM-52, etc.) in the completion of which they use their own central unit and peripherals (line printer, display, etc.) as well as hardware devices partly of socialist manufacture. An attempt is now being made to solve the technical and prime contracting problems for completion of a remote data processing system based on medium and larger ESZR computers; the Telephone Factory, for example, may have a significant role in this.

Increasing the complexity and the intellectual fraction and increasing the export thereof are underway and we do not feel that special measures are needed.

[Question] Automation, the computer control of technological process, is one of the most important factors for economic development in the future. The possibilities have expanded with the appearance of cheap microprocessors. What is the situation here? Is the ministry planning a special program for computer automation of technological processes?

[Answer] Automation, automatic control of technological processes, plays a very important role in economic development. The task to be solved in the national economy is twofold. In the first place the goal in the user branches is ever broader use of control technology in both productive and non-productive processes. This depends on investment possibilties and on the level of automation required.

In the second place it is necessary to develop the domestic industrial background for this automation--in addition to joining into the international division of labor.

The domestic manufacture of automatic devices has the task of satisfying the needs of Hungarian machine manufacture and of other branches in the given product composition.

In addition, equipment systems produced for export are significant also.

At the present stage of technical development modern computer technology devices are widely used in automation and in the automatic systems being manufactured.

Computers and technologies using computers or microprocessors are receiving an ever greater role. Many institutes and enterprises are dealing with the development and use of hardware and software and with the automation of process control.

The microprocessor or programmable modular devices which can be widely used in industrial automation include: the Videoton RPT (Remote Process Terminal), the MMG-AM [Measuring Instruments Factory Automatic Works] SAM 80, the VBKM [Electrical Equipment and Appliance Works] Aquareg and PDV-14, the Gamma C-801 process control and the Vilati [Institute of Electrical Automation] NC and CNC equipment of the EMG [Factory for Electronic Measuring Instruments]. In addition, a number of research institutes are working on the development of equipment which will have industrial applications. These include the KFKI [Central Research Institute for Physics] CAMAC and the Dialog equipment of the MTA-SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences].

Several forums have dealt recently with a determination of future tasks and necessary measures. They have designated the directions for development in this area.

The OMFB has worked out and adopted a conception for the long-range development of automation and of automatics industry activity.

Automation plays a stressed role in the technical development policy conception set for the Sixth 5-Year Plan. On the basis of this they have developed a technical-economic study on "manufacturing development of automated technological control system."

A research and development program for automation devices and systems has been sent to the OKKFT for adoption. Within the framework of this the development of automated technological process control systems and of automation devices were defined in sub-programs which include the development of the intelligent sub-system modules and most important devices necessary for system deliveries.

Cooperation has begun with the Instruments Industry Ministry of the Soviet Union to explore the possibilities for domestic use of Soviet technological control systems and their use in concrete technologies. We are now examining the possibility of domestic use of two automated technological control systems (for rolling works and textile mills) and the development of the technical conditions for such use.

All of these proposals take into consideration in a far-reaching way the achievements and tools of computer technology development and manufacture. In addition, the manufacturers of automated devices (primarily the MMG-AM, Vilati, the VBKM and Gamma) have their own microprocessor equipment, developed by them or manufactured on the basis of license, and several enterprises and institutes are dealing with the development of such equipment or ad hoc systems.

In light of the above it is my opinion that no separate special program is needed for computerized technological process automation.

[Question] The development of products and technologies requires paying attention to the international front rank, recognizing and following the trends. But research and development, in themselves, place a great burden on those doing such work; so supplying them with scientific and technical information is a first priority interest. What is the conception of the ministry about the realization in this area of the science policy position which prescribes raising the level of the supply of technical and scientific information?

[Answer] Even heretofore the research institutes operating in the area of the branch have been paying attention to the international front rank and making information available to enterprise development sections and research and development bases. They have been aided in the collection and dissemination of this information by the KG-INFORMATIK and the OMDK [National Technical Library and Documentation Center]. In the interest of intensifying R and D activity and of ensuring the realization of the system view in the electronics branch as a whole and within the several special branches, down to the level of product families, we are now designating system institutes and base institutes for the several special areas. Within their special areas these institutes must attend to international trends and must provide the manufacturers with the information thus acquired.

[Question] High level guidance and decision making are based on the collection, storage, amassing and retrievability of reliable and timely data, in a word on an information system. Where does the KGM stand in the creation of its own integrated branch information system and what are its links to the enterprise information systems? Does the ministry plan to create a computerized network for this purpose?

[Answer] The development thus far of the KGM's own branch information system has been based largely on enterprise data obtained within the framework of central data services (the KSH, the Ministry of Finance, the Ministry of Labor, etc.) and to a lesser extent on data services set up by the ministry. The branch information system is divided into two large sub-systems, the so-called technical-economic sub-system and the technical-scientific sub-system.

Until recently the part-systems in the technical-economic sub-system developed and operated separately with the goal of later integration. In addition to the computerized part-systems which were developed there are a few systems based on manual processing. As a result of this there is much valuable information which cannot be used properly. Despite all this, information work is definitely developing; the number of special areas being evaluated and the level of analysis are increasing. The utility of synthesizing analyses is increasing.

Because of the technical limitations noted the return of information to the enterprises cannot be considered satisfactory although in the past few years there has been progress in this regard also. The provision of information to the enterprises is realized largely by sending out enterprise rank analysis publications--disregarding the directors' conferences where we almost always provide evaluative information.

The technical-scientific sub-system contains textual and numeric information on products, technologies, market information and economic information at the enterprise level. Information is provided about this.

The information comes in part from domestic documents and in part from international data. I might mention the following part systems as examples: research and development information, patent descriptions, standards, literature research, separate observations on stressed themes, etc. In addition to the domestic work, participation in the creation of the CEMA International Scientific Information System has been very substantial.

On request the KG-INFORMATIK, which deals with this, will follow a theme for the enterprises or will provide retrospective information for a longer period.

The ministerial conference recently adopted a resolution pertaining to the further development of the information system. We prescribed the acquisition of a computer which will make integration possible and an accelerated realization of preparatory work and the introduction of the system. We calculate that a modern information system extending to the entire branch will be realized during the Sixth 5-Year Plan; this will embrace all professional areas. We determined to raise the level of analytical activity, building on the new possibilities given by computerization. Our goal is to make it possible for our enterprises also to make use of the results of swifter, more precise and more synthesized information work. At first this will be made possible by sending out bulletins containing analyses; later, in due course, we want to make possible direct computer links.

[Question] Awareness factors and the level of professional culture influence the execution of organizational and computer technology applications tasks in an extraordinary way. How does the comrade minister evaluate the cadres of the ministry and of the enterprises from this point of view? How do you want to increase the preparedness of the leaders for active support of the execution of organizational and computer technology tasks?

[Answer] The great majority of the high level leaders of the ministry and of the enterprises falling within the sphere of ministerial appointment have high level professional training. So they are adequately prepared to accept and use the organizational and computer technology applications tasks. Nearly 60 percent of the middle level enterprise leaders also have high level professional training.

We have already included information on organizational and computer technology tasks and methods of use in the thematics of various leader training courses and they are being taught. The high level enterprise leaders falling in the appointment authority sphere of the ministry, who have participated in the further training courses of the National Leader Training Center for years, have received further training on these themes. Seventy percent of these leaders have already participated.

The teaching of organizational and computer technology information also figures in the further training courses for high and middle level leaders. Each year 600-650 people receive further training in this form.

On the basis of a ministerial directive the Organizational and Computer Technology Committee was formed on 6 November 1979; it has the task of developing an organizational and computer technology applications program for the ministry and working out conceptions.

In the period ahead the Metallurgical and Machine Industry Organization and Computer Technology Institute will carry out the tasks of organizer training.

The Metallurgical and Machine Industry Further Training and Methodology Institute--on the basis of a program to be prepared by the Metallurgical and Machine Industry Organization and Computer Technology Committee--will establish, together with the Videoton Electronics Enterprise, a Computer Technology Instruction Center which will train the students in the courses with the aid of all the computer prototypes, displays, industrial television, etc. manufactured at the enterprise.

In the period ahead our ministry wants to increase the preparedness of the leaders for execution of organizational and computer technology tasks with increased emphasis in accordance with its significance.

[Question] It is well-known that the comrade minister used to head one of our largest industrial enterprises. On the basis of your personal experiences, what is your opinion about the technical level of guidance, about the necessity and real possibilities of organization and about the role of computer technology? As a most experienced leader, what can you say to the leaders so that they can stand their ground in the fulfillment of their organization and computer technology applications tasks?

[Answer] Guidance techniques have developed much in recent years but the organizational level of material processes has not kept pace with this. The modernization of guidance techniques presupposes the development of organizational activity and a purposeful utilization of computer technology. Practice thus far shows that in many cases a computer is regarded simply as a fashionable tool. It is well-known that computer investments require a great outlay; but the efficient use of the technical equipment put into operation depends on the organizational preparation therefor. As long as the organizational purposes deriving from enterprise plans do not make it clear whether the development of organization requires the use of computer technology we cannot talk about a computer. If the decision is to make use of a computer technology tool then the first step must be organizational preparation. This involves not only a reorganization of guidance processes but also the necessary transformation of the material process system being guided and an organization of the link between the two. All this will appear in a development of operations, organization and the decision making system and in the development of a new information system. The computer can be put into operation only after ensuring the organizational, personnel and incentive conditions. It thus follows that the role of organization is the primary one.

Our domestic and international experiences alike show that those enterprises work with truly great efficiency where organization is regarded as a real function of leadership. It is very important that the leaders should not feel that organization is a necessary evil; rather, they should recognize its significance and its role in increasing efficiency. In this matter the number one leader should always provide an example and the leaders at every level should exercise the organizational function in their own position. As I have noted already, computer technology should be regarded as a tool of organization; without this it will be difficult to ensure enterprise flexibility and efficient operation. So the harmonious cooperation of leadership, organization and computer technology utilization is crucial. This also points up that organization and computer technology (where it is needed) should work in a coordinated way, in close organizational contact. The organizational and computer technology apparatus should be subordinated to the leader of the enterprise--because they are carrying out coordination and information processing which embrace the entire enterprise. I consider it very important to emphasize most strongly that organization is not the special task of the professional organizational apparatus alone; it is also the task of the functional organizational units which must do this work with central coordination.

It is also worth noting that if we are to expect results in the development of organization and computer technology then the necessary conditions must be provided to the professional area--from providing the information, through a suitable interest system to a trained labor force. On the basis of all this, it is the task of the leader of the enterprise to make people aware of the importance of the role of organization in the functional and operational system of the enterprise.

It is well-known that the productivity level of our industry lags considerably behind the productivity level of developed capitalist countries and even of some socialist countries. I am convinced that one of the most fundamental causes of this--together with other factors--is our backwardness in the level of enterprise guidance and organization. Our studies show that those enterprises have competitive products and have a more favorable product structure which have recognized the necessity of and have begun the professional organization of their activities.

It is also well-known that our economic situation demands that we look around our own house and discover those reserves which can result in increasing efficiency. As our investment possibilities shrink and manpower resources become exhausted, development must be ensured with the existing resources. A very substantial and swift improvement of organizational work and of guidance is necessary for this.

I would like to call the attention of every leader to the fact that this road is not an easy one. It requires very careful and meticulous preparation; it presumes resolute determination, unvarnished attention to detail, consistent measures, strict discipline and precise, swift information. The time required for preparation is great; execution often makes necessary unpopular measures; but this is the only road to be followed if our progress is to be palpable by international standards.

In my opinion every leader who has not done so already must immediately begin to develop and organize a modern guidance and information system. The decisions pertaining to this must not be put off because of the costs involved or because of changes which may go to the root, because we will pay many times for all time lost.

8984
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HUNGARY

OPERATING PRINCIPLES OF ES 2 SERIES

Budapest SZAMITASTECHNIKA in Hungarian Feb 80 p 4

[Article by Dr. Ferenc Gemes: "The ES 2 Series; More Important Operating Principles, IV"]

[Text] Editor's Note: In our series on the more important operating principles of the second series of the ESZR [Uniform Computer Technology System] we will now discuss the overlapping of instructions at the time of their execution, the improved time and the recording of program events.

Overlapping of Instructions at the Time of Their Execution

The whole process of executing computer instructions can be broken down into the following part processes:

Instruction reading	Preparation phase
Address modification	
Reading in the operand	
Actual execution of the instruction	Execution phase
Setting the condition codes	
Result storage	
Re-setting the instruction counter	

In the machines of the ES 2 series, in the interest of decreasing operation times, separate equipment was built in for the preparation and for the execution phases.

The activity of the earlier counter extends to the execution phase of machine instructions. As the listing itself shows this means not only arithmetic functions but also includes the transfer of information between various parts of the central processing unit, primarily between basic and local storage. The counter has tasks in processing program interruptions, in operator and diagnostic processes and in actuating the timer.

The new counters contain several buffer registers with the aid of which it is possible to overlap the operations of the execution phase in time. In floating decimal operations, for example, the processing of the exponent and the mantissa take place in parallel, at the same time.

A separate instruction preparation unit is built into the models of the ES 2 series too, the work of which begins at the time of changing the content of the instruction counter. At that time it initates the turn to storage for the purpose of obtaining the next instruction. It then selects from the 8 byte store access unit read in the starting point of the next instruction and an analysis of the instruction code which can be found here provides unambiguously the place setting of the instruction. On the basis of a recognition of the instruction form it is possible to execute a possible address modification of the operands. Instruction preparation uses for this purpose the general registers located in local storage also. The work of the instruction preparation unit is completed by calling up the operands. In the course of these part processes it handles the dynamic address transformation needs which may arise.

The instruction preparation unit contains an instruction counter, an instruction register and a buffer series in which one can store the sequential instructions which have been prepared to various levels; thus the several part processes of preparation can run at one time. In the ideal case one can limit the entire execution time needed for an instruction to the time of the execution phase. In the case of jump instruction, however, it may happen that a prepared series of operations must be discarded; in this case the instruction preparation unit processes the next instructions in the direction of the jump. The micro-program of the jump instruction recognizes whether the instruction preparation took place in the correct direction, on the basis of the given conditions, or whether it must go in another direction. In the latter case the prepared instructions are erased from the buffers but they are also erased when some control condition changes (for example, with the input of a new PSW). Since storage is being used by both the counter and the instruction preparation unit it can happen that they will turn to storage at the same time. If they turn to storage at the same time the following priority is valid:

1. accessing the operands of the current instruction,

2. the preparation unit reads the operands of the next instruction,

3. the preparation unit reads the other instructions.

The Improved Timer

For compatibility reasons one can find in the new models the time known from the machines of the ES 1 series. As is well known, this really measures time intervals; on the 24 bits available to it it indicates the remaining time of a set time interval with a precision of 1/300 seconds. This time data can be found in the constantly occupied 80th to 83rd bytes of basic storage. The maximum time interval is about 15.4 hours.

In the models of the ES 2 series there is, in addition to the foregoing, a daily time clock and a central unit timer. The new timer works closely with the counter and with basic and local storage. The time value, in the form of binary fixed decimal data, can be used for measurement and for program interrupt purposes. The daily time is contained by data of 52 bit length in micro-second units. Its value domain is about 143 years, which is practically inexhaustible. This clock also works in the stop mode. The initial daily time can be set with the aid of a special instruction but the instruction is effective only if one operates a switch or key, depending on the structure of the concrete model, on the control unit. A time comparison device is also attached to the clock showing daily time. Values for time comparison can be set with the aid of an instruction; thereafter this value is constantly compared with the daily time. When the two data agree a program interrupt occurs. Thus certain processing can be started or stopped at determined times of day with properly set daily time.

The other new device, the timer of the central processing unit, also works with data of 52 bit length. In reality this also gives time intervals, as has been used heretofore, but it works with greater time divisions. The set time decreases by one in micro-seconds. A program interrupt occurs if the value of the timer becomes negative. Program interrupts which would be produced by the timer can be suppressed by masking (PSW 7 bit and 0 control register).

Recording Program Events

Program event recording (PER) equipment is built into the models of the ES 2 series to facilitate program tests. With the aid of this one can indicate when any of the following events happen in the program:

--a successfully executed jump instruction,

--calling an instruction from a designated storage area,

--a change in storage content within a designated area,

--a change in the content of designated general registers.

On the completion of an instruction to be recorded there is an interrupt due to program drop-out. The code of the event is written into the permanently occupied 150th byte of storage and the address of the pertinent instruction is written into bytes 153-155. The four sorts of events listed can be recorded in any combination; to do this the sub-mask bits of the 9th control register must be set accordingly. In addition to setting the mask bits, other information is needed for most events. If, for example, we want to observe a change in the content of a general register then we must give the number of the pertinent register in the second half-word of the 9th control register. To observe storage areas the area boundaries must be written into the 10th and 11th control registers. If the initial address of the given area is greater than the address of the completion then this means that the area between the boundaries will remain out of the recording.

The use of program event recording is bound to the extended control (EC) mode. At such times the first bit of the EC PSW contains the chief mask for recording use, which, when switched off, makes the PER equipment useless.

(To be continued.)

8984
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DEFICIENCIES OF CZECH TYPEWRITER LEAD TO DEVELOPMENT OF NEW MATRIX CONSOLE

Budapest SZAMITASTECHNIKA in Hungarian Feb 80 p 5

[Article by Peter Molnar, Ference Horvath and Istvan Labodi: "A Matrix Console on SZAMKI's ES-1022 Computer"]

[Text] Experience in operating the ES-1022 computer of the SZAMKI [Computer Technology Research Institute] has shown that one of the narrowest cross-sections is the CONSUL typewriter of Czechoslovak manufacture. Its low speed, its relative unreliability (which can be explained by the complicated mechanical design) and the bad supply of parts can cause the most serious problems. And the breakdown of the central console causes the stoppage of the system, which significantly reduces the useful machine time of the computer. Thus the idea arose that it was necessary to acquire a fast, reliable console typewriter. Although many are working on the development of such equipment here at home and in other socialist countries no one would undertake to deliver a console within an acceptable time limit. So our problem had to be solved with our own develoment.

The Conception of the Console Developed

Servicing the ESZR [Uniform Computer Technology System] multiplex channel requires rather significant electronics so the development of a complex hardware junction unit would require too many people and too much time. So we had to abandon this idea.

But the demands made of the junction unit are eased if the majority of the tasks of the console can be carried out by peripherals which are slow in regard to data transmission speed, thus by hardware controlled by a microprocessor. Thus the complexity of the equipment to be built can be reduced to such a level that it can be built domestically in a short time.

The disadvantage of a microprocessor junction is that the transmission of a character requires more than 20-40 microseconds of channel time; its advantage is simplicity and the fact that this solution gives a relatively free hand in the selection of the console mechanism. In essence any microprocessor can be used; that is, one could consider using equipment with either the V24 or ISO7 interface. At the SZAMKI we selected the available RC 835 equipment, which is a DZM 180 matrix printer with keyboard.

The Structure of a Console Controlled by an M 6800 Microprocessor

The structure of the console can be seen in the block diagram. Line receivers and drivers connect the special junction electronics to the ESZR multiplex channel. The junction electronics carry out those tasks which have to be carried out by hardware. This is necessary because the channel response times do not make it possible to carry out these tasks by a program, controlled by a micro-computer.

The connection between the microprocessor and the junction electronics is provided by PIA's (peripheral interface adapters). One each PIA interface provides in/out data exchange and another PIA interface transmits various controls from the microprocessor to the junction electronics.

The junction electronics communicate information to the microprocessor by means of interrupts and the interrupt levels are also transmitted by a PIA interface.

We built the M 6800 micro-computer with 2 Kbytes of ROM and 128 bytes of RAM. The console mechanics are driven by an ACIA (asynchronous communications interface adapter). This can be programmed to operate peripherals of various speeds.

The programming of the PIA's and the ACIA takes place after the "selective reset" or "system reset" which can be executed from the channel and the computer then goes into an interrupt-wait state.

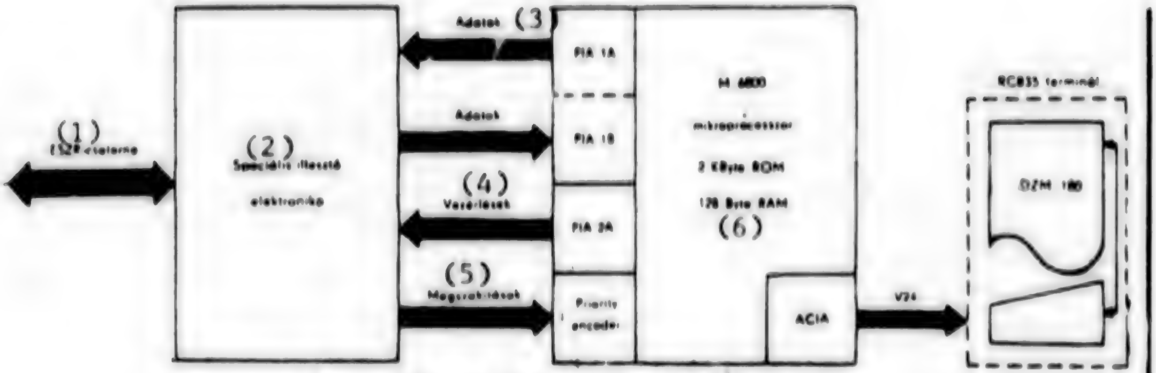
Every action begins with an interrupt and the level of the interrupt--and the flags previously stored by software--unambiguously determines the necessary procedure. The software also provides those logical functions which substitute for certain mechanical properties of the console typewriter; for example, it counts the characters struck and issues CR-LF characters at the end of the line. The software also executes the necessary code conversion.

Experiences

The new console has been regularly used for more than half a year in an OS and DOS environment. Its positive effect, which can be measured in computer performance also, can be seen in two respects; the matrix printer is a more reliable hardware element than the linkage CONSUL typewriter and thus malfunctions are more rare.

But even more significant than this is the effect of increasing speed. As a result of this the console has become a "real time" device; because of

Block Diagram of Matrix Console Junctions



A mátrixkonzol illesztésének blokkdiagramja

1. ESZR channel
2. Special junction electronics
3. Data
4. Controls
5. Interrupts
6. M 6800 microprocessor with
   2 Kbytes ROM and 128 bytes RAM

the high speed of the printer system messages are written out immediately, without waiting, thus indicating not the previous but the actual state of the system.

This gives the operator much greater opportunity for more flexible management of the system and thus for more efficient use of the ES-1022.

Taking everything together the usefulness of the ES-1022 computer has increased by more than 10 percent with the use of the new console. Thus it would be useful to use the peripheral exchange developed by us in all those places where ESZR computers are used in a changing, dynamic environment similar to the SZAMKI--which places too great a burden on the operator's console.

Further Possibilities

As we noted above the purpose of the development was to solve an everyday problem; for this reason we selected the simplest solution immaginable--except for the greater speed and reliability the console built by us can do no more functionally than the original console.

This does not at all exhaust the possibilities given by a micro-computer. In what follows we will outline the further possibilities given without having to change the hardware of the junction equipment.

It is possible to correct the messages without the intervention of the large computer (for example, by introducing a backspace character). Standard, often repeated messages could be stored in the ROM and issued by a simple procedure. These might include, for example, automation of the entire IPL process.

The console typewriter could be provided with a real-time clock and in this case the date and precise time would be given automatically. We intend to do some of the above in the future.

8984
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HUNGARY

RYAD, MINI-RYAD LINE PRINTERS DISCUSSED

Budapest SZAMITASTECHNIKA in Hungarian Feb 80 P 5

[Article by Peter Keszthelyi: "Line Printers"]

[Text] The member countries have developed various types of line printers since the creation of the Uniform Computer Technology System. We will deal here with those types which are used in our homeland or which will be within a few years.

The first R-20 computers were equipped with ES-7030 line printers of Soviet manufacture and later, from 1975, with ES-7032's, also of Soviet manufacture. The latter were delivered for the first R-22's also.

Since 1977 the Polish firm MERA has been manufacturing the ES-7033 type on the basis of an ICL license. Since 1978 only this type has been obtainable in our homeland. The ES-7031 line printers, of GDR manufacture, were delivered for the first R-40 computers but later they also were converted to use the ES-7033. They will probably be delivered beginning in 1981. New types have been developed in the Soviet Union and the GDR last year. The Soviet ES-7037 has already been approved; the GDR type is the ES-7039. In Hungary Videoton is also developing a line printer which can be connected to large ESZR computers (the ES-7184 BM). The equipment will be approved in the middle of next year so its model number is not yet final.

The table contains the technical data for the equipment mentioned. It can be seen from this that only the chief technical data are known for the two most recent pieces of equipment.

Except for the ES-7037 and the ES-7039 the equipment uses character barrels. The ES-7037 and the ES-7039 are chain printers.

The character barrel type prints with the aid of a constantly turning printer barrel. The entire character set can be found on the surface of the barrel in all printing positions. The actual character in the printing position is determined by a code disc turning synchronously with the letter barrel. In the chain printer the printing is done by the "links" of the chain

Type	ES-7030	ES-7031	ES-7032	ES-7033	ES-7037	ES-7039	ES-7184 BM**
Print speed (lines/minute)	650-890	900-1200	900	600-1100	1200	1200	1200
Paper advance							
mode	asynch.	asynch.	asynch.	asynch.	asynch.	asynch.	asynch.
time to first line	18	20.7	16	13.5	x	x	60
time to next line	10	6	10	4.03 or 5.36	x	x	14
Characters per line	128	120	128	128 or 160	132	160	132
Character set	96	63	96	83+1	48, 64 96, 128, 192	84	48, 64, 96
Type of buffer storage	ferrite	ferrite	ferrite	(ferrite) semi-con.	x	x	semiconductor
Placement of characters	barrel	barrel	barrel	barrel	chain	chain	barrel
Printed paper							
type	leporello (same for all)						
width (mm)	80-120	60-420	80-420	max 458	x	x	80-420
Number of copies	2	3	5	3-5	5	x	5
Manufacturing country	USSR	GDR	USSR	Poland	USSR	GDR	Hungary

Notes:

x -- data not known
** -- code number not final

(which contain the characters), which is constantly moving. The advantage of this solution is that the horizontal position of the characters in the printing picture is even, the line is not wavy. Here, naturally, a code disc turning with the chain determines the position of the character. The character set can be placed on the chain 2-6 times, depending on its size.

The data to be printed go to printer control via a buffer. Every character code is checked before being written into storage. The buffer storage can hold one line of character codes. During printing the control block compares the code of the character stored in the buffer with the combination of the binary place values coming from the code disc. In the event of a positive result of this comparison--that is, if the desired character is in the proper print position--the designated printer amplifiers (hammer amplifiers) receive control and activate the electromagnet which operates the printer hammer. Paper advance after printing is controlled by punch tape depending on channel command (the so-called carriage tape).

The paper is advanced by spiked wheels of chains which engage perforations along the edge of the paper. The line printer is connected to a channel of the computer (generally the multiplex channel) and works according to commands received therefrom.

The equipment has a check and control panel for the swift prevention of errors independent of the programs running in the central unit. The ES-7033 is a modern type. It has integrated circuit electronics (digital TTL and MOS type--SSI, MSI and a few LSI elements and analog--for example, power unit--integrated circuits) made of silicon based semiconductors. The buffer of the printer is also made up of semiconductors today; the code changer also has semiconductor (ROM) elements. The ES-7033 is most reliable. The average operational times between two errors (the MTBF) are 128 hours for the ES-7030, 140 hours for the ES-7032 and 245 hours for the ES-7033.

Experience with the ES-7033 shows that the "most critical" unit is the hammer amplifier; this breaks down most frequently.

A need has arisen in our homeland in recent years for the use of accented characters. It was first possible to include these in the ES-7033, by changing the character barrel and by supplementary addition of a printed circuit card. In the modernized version being manufactured today it is sufficient to change the code changer ROM instead of adding a card.

In the case of chain printers, naturally, it will not be necessary to change the entire chain; it will be sufficient to change a few links.

The Videoton line printer will have available a barrel with a 64 character set containing accented characters.

8984
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COMPUTER SIMULATION OF SOLID-STATE TECHNOLOGY

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[Abstract] The STEP (Silicon Technology Evaluation Program) program system, developed jointly by the Department of Electronic Devices of the BME and the KFKI, is briefly described. The input data are the silicon integrated circuit technology steps, represented by the following parameters: predeposition, doubling, epitaxial layer growth, oxidation, ion implantation, etching, oxide-nitride deposition, and metalization-polysilicon coating. The user-oriented input language is that of the SUPREM-II program developed at the Stanford University Integrated Circuit Laboratory. After simulation of the individual technological steps, the distribution of all additives is obtained, from which the postprocessor segment of the program establishes the following, as required by the user: 1) The active resultant additive concentration distribution in graphic form; 2) The depth configuration characteristics (oxide-nitride thicknesses, transition depths); 3) The electronic parameters of the individual transitions (low-level I-U characteristic, emitter efficiency, space-filling capacity); 4) The electronic parameters of the individual semiconductor layers (square resistivity, transport factor, penetration voltage); and 5) The MIS structural parameters (oxide-nitride capacitances, MIS capacitance, threshold voltage). The algorithms of diffusion modeling and oxidation modeling are briefly described. References 4: 1 Hungarian; 3 Western [2502/58-2542]

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PHYSICAL MODELING OF IC CIRCUIT ELEMENTS THROUGH CIRCUIT SIMULATION PROGRAM

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[Abstract] The TRANZ-TRAN nonlinear circuit-analysis program, developed during the 1960's at the Department of Electronic Devices of the BME for the evaluation of circuits containing primarily integrated-circuit components, was expanded so that it can now also consider thermoelectrical effects. The method, based on the general transport theory of thermodynamics, could be readily incorporated in the program. The extended program is suitable for tasks such as analyzing the temperature distribution, cooling effect, and switching heat transients of Bi_2Te_3 cooling elements based on a medium model. In the course of discretization, the method utilizes not only the classic basic components of circuit theory (resistivity, capacitance, voltage and current generators) but also more complex solid-state components such as bipolar transistors. Various models were developed for simulation of I^2L elements, which describe the operation of the element and describe its major parameters in an adequately accurate manner. The model of MOS transistors, with a topology similar to that of the Ebers-Moll model of bipolar transistors, was also incorporated in the program. In addition, relatively complex digital circuit units (gate circuits, RS flip-flops, and the like) and relationships between temperature and substrates were also included. Some examples of the use of the program are presented. Figures 12; references 13: 6 Hungarian; 1 German; 6 Western. [2502/58-2542]

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ACTIVITY OF MARINE RESEARCH INSTITUTE DESCRIBED

Bucharest FLACARA in Romanian 21 Feb 80 p 6

/Interview with Virgil Iordanescu, director of the Romanian Institute for Marine Research, by Razvan Barbulescu/

/Text/ Virgil Iordanescu was born on 28 September 1927 in the town of Giurgiu. He studied at the Mihai Viteazul Military Lyceum in Timisoara, the Fishing and Piscicultural Institute in Constanta (1954) and took postgraduate courses for economist engineers at the Bucharest Polytechnical Institute. His doctoral thesis in pisciculture was entitled "Haleutic Resources of the Atlantic Ocean and Romania's Participation in Utilization of These Resources." His scientific works, in individual and joint authorship, include "Biological Resources of the Planetary Ocean," "Ways and Trends of Introducing Scientific-Technical Progress in Sea and Ocean Fishing" (the second book involves joint authorship). His awards include the Order "Star of the Socialist Republic of Romania," the medal "Scientific Merit," and others. He is the scientific director of the Romanian Institute for Marine Research in Constanta.

/Question/ Though the activity of the institute of which you are a leader is not unknown, it seems to me that beginning with a brief description of the Romanian Institute for Marine Research would be useful to the readership.

/Answer/ Actually, in March 1980, exactly on 16 March, our institute will mark its 10th anniversary. Its activity is developing in a multidisciplinary context, helping to meet the needs of socioeconomic development of Romania in terms of information and technology. More [illegible] the topic of our work certainly is the marine environment. The major guidelines in our activity are: exploring the fishing resources in the Black Sea and the world ocean, improving the techniques for fishing and processing of the catch, formulating methods for raising valuable marine organisms, estimating the evolution of the chief environmental factors in the Black Sea, and developing equipment for marine exploration.

It is clear that our objectives take into consideration the needs of the country's economic development, with the institute's research plan being worked out in conformance with the main guidelines regarding scientific research incorporated in the Program-Directive approved by the 12th Party Congress.

/Question/ The fact that we come every year to the seaside causes us to believe that we indeed know the sea. But do we really know the Black Sea?

/Answer/ Everyone may know it more or less, depending on the person's background. For instance, it is known that the Black Sea does not have any tide. Its salinity is low, about 17 gr salt per thousand, on the average, while, as an example, the Mediterranenan Sea has 35 gr per thousand. Life in the Black Sea only develops down to 200 m depth because at a lower level there is a layer with very high amounts of hydrogen sulfide. Actually, we could say a lot of things. But, of course, after a few sea bathing sessions during the vacation one cannot know very much about the sea. Only, maybe, if the water is or is not clean, hence if the sea is polluted.

/Question/ And is the Black Sea a clean sea?

/Answer/ At any rate, we cannot assess it as polluted, but we also must admit that pollutants have appeared. I have in mind the intensive and rapid industrial expansion of the coastal area in recent years. Moreover, the Danube also may become a polluting factor. However, we regard the Black Sea as a clean sea because the above factors do not destroy its biological and ecological balance. In the context of broader topics we are permanently monitoring the evolution of the marine ecosystem and of the populations of the chief component species in the Romanian sector of the sea, and evolution caused by the change in the environmental factors. This procedure permits us to estimate the structure and quantitative and qualitative composition of the species involved, the causes of the changes in these systems, and prevention of imbalances.

/Question/ What are the accomplishments of the institute in terms of combating the pollution of the Black Sea?

/Answer/ For instance, in terms of hydrocarbons, we have developed a type of dams which limit the spread of oil and we also have patented an absorbant dust called Petroabs. This dust only absorbs oil and not water and becomes a consistent mass which can easily be picked. Both the types of dams and the dust, as I mentioned, have been developed domestically and in terms of performance compare well with foreign makes. The chemistry chair of the Bucharest University and specifically Prof Nicolae Barbulescu, gave us special assistance in these accomplishments. The institute also has produced an antifire dam and the prototype of an oil recuperator which does not use Petroabs.

/Question/ Now, that we are rather relieved to hear that the sea of all our summers is not polluted, let us talk about fishing and the institute's research on fishing. First, about fishing in the Black Sea.

/Answer/ Here we have a passive fishing. The fishes enter the nets and are then transported. That is why our fishing in the Black Sea is light.

/Question/ What are the projects in the future?

/Answer/ For 2 years now we have been making studies on the fish resources in the open sea. Next year we shall receive two new vessels for the purpose of stepping up these studies. Switching to the open sea zone will double and even triple the sea fish catches. Also, we have projects involving acclimatation and intensive cultivation of marine organisms with a high economic value and fishes, but also invertebrates such as shellfish, shrimp, and so forth. We are concerned with intensive raising of native organisms, focusing on the physiological study of these species and also the acclimatation and raising of other organisms that live in other seas and oceans.

/Question/ Can you give an example?

/Answer/ We have made progress in terms of upgrading the technique of raising marine organisms such as raising mussels on mounted structures, testing prospects for acclimatizing large shrimps, intensively raising young pikes in seawater. Two years ago and last year we brought lots of oysters from England and we monitor their adaptation continuously. The studies are complex and involve the oysters' behavior under the environmental conditions of the Romanian seacoast.

/Question/ Why did you specify, of the seacoast?

/Answer/ Because the environmental conditions of the sea differ even along the coast. They are not identical at Sulina and Mamaia. The major problems of raising involve reproduction, food, provision of optimal densities, environmental conditions which are propitious for rapid development. The acclimatation period must be as short as possible.

/Question/ Let us now talk about the ocean. Recently, research workers of the institute went on an expedition to the subantarctic zone. Can you elaborate?

/Answer/ It is the first Romanian expedition, organized on a Romanian ship, with a Romanian research program. Why do I point out this fact? Because there have been expeditions in which Romanian researchers were involved, but they were either on foreign ships or based on foreign programs. The ship involved now is a supertrawler and is called "Tirnava." The research staff includes Stefan Pircalaboiu, Viorel Dumitrescu, Adrian Cociasu, Angela Pintilie, Gheorghe Radu, Viorel Malciu, Tanase Soare, and Mihai Trocan. The eight researchers left for Luanda, wherefrom, aboard "Tirnava" they will sail toward the subantarctic zone. Of course, the goal of the expedition involves studying the area for large-scale fishing.

/Question/ Is there a lot of fishing in the world oceans?

/Answer/ Very much.

/Question/ Probably, in this context, there also is keen competition.

/Answer/ Indeed, the new maritime law regulations limit the possibilities of access to the zones which are rich in fish. Actually, these regulations reflect the political and social changes which have occurred in recent years in the world. Therefore, in addition to research conducted in conventional zones, we must seek new zones, outside the waters of national jurisdiction. But the seas and oceans of the world, which total more than 70 percent of the earth's surface, make up an immense territory where there is room for everyone.

/Question/ Your doctoral thesis focuses on the fishing resources of the Atlantic Ocean. How can the above ocean be described from this point of view and also Romania's participation in utilization of these resources, a matter which also was discussed in the thesis?

/Answer/ The biological resources utilized in the Atlantic Ocean mainly involve fishes. Prominent among invertebrates are the mussels. Data indicate that for many of the mass species which are involved in Atlantic Ocean fishing the limits of intensive fishing have been reached. This situation primarily involves the northern sectors for some species of Clupeidae, Gadidae, and so on. However, there are species and zones which have been very little or not at all utilized. Studies indicate that, for instance, the resources of Cephalopoda are large enough for a far more intensive industrial utilization. But fishes still are the most numerous and widest spread animals, which occur at all latitudes and depths. That is why the productive potential of the various species also is very great. As for Romania's participation in the study and utilization of the resources of the world ocean, it will expand, as, moreover, it was specified in the Program-Directive adopted by the 12th Congress of the party. To use an example, work was commenced at Braila on building an approximately 3000 dwtship for oceanological research. She will make it possible to conduct research expeditions in the planetary ocean. We must also point out that we are conducting research in cooperation with other states and that, based on contracts, we make studies for foreign partners, as for instance, a very thorough study of Lybian waters, which has been very well assessed by the customer.

/Question/ Let us go back home, to the Black Sea. A very topical task of the institute focuses on the power-producing potential of the sea waves. What can you tell us about these studies?

/Answer/ Our plans involve realizing, by 1985, an experimental pilot station for utilization of this nonconventional source of energy and by 1990, based on a small installation, in the context of local facilities, saving approximately 50,000 tons of conventional fuel.

/Question/ In what stage is the unit for desalinization of seawater?

/Answer/ Experts first realized an experimental unit for studying desalinization of seawater and determining the state parameters of the process and the operational factors of the unit. Work is now proceeding on the project which, in the near future, will underlie the production of the unit's prototype. The installation will serve to obtain drinking water from the marine environment and will also permit using the salt amount from which useful chemical elements can be extracted: magnesium, potassium, and bromine. Requests for this installation already exist here and abroad. The station is based on a domestic design and the procedure of operation is different from that of foreign counterparts. It is more cost-effective because it makes fuller use of seawater and in terms of energy consumption.

/Question/ Probably we could use the facility which will utilize the power of waves as the source of energy?

/Answer/ Of course. The installation can be connected to nonconventional sources of energy.

/Question/ I understand that the institute also is concerned with equipment for marine research and exploration?

/Answer/ An apparatus which measures the amplitude and frequency of waves is now being realized. It is based on domestic research and is used in our research program for study of the situation of waves on the Romanian sea coast. Moreover, a unit for detecting fish shoals is ready. It has visual finishing and is successfully used in open sea research in the Black Sea. In the next two years we plan to develop, based on domestic research, a minisubmarine which will permit conducting shallow subaquatic research.

/Question/ There is more and more talk about the benefits from marine research for the pharmaceutical industry. To my knowledge, in this context there are cooperative relations between the institute and Biofarm?

/Answer/ New processes and procedures have been developed for extracting and purifying phospholipides, antihyaluronidases and licheinsulins from fish wastes (heads and viscera) and from marine invertebrates for the purpose of utilizing these active factors in the pharmaceutical industry. The studies, in conjunction with Biofarm, are continuing and the only addition I can make is that the studies are successful.

/Question/ We are now at the end of our talk. How can you briefly assess Romanian marine and oceanic research after 10 years of operation of the Romanian Institute for Marine Research?

/Answer/ We have succeeded in diversifying the objectives in a broad disciplinary context. The area of topics now intersects with the very different fields of economic activity in Romania: sea and ocean fishing, evaluation and utilization of new sources of energy -- what I was pointing out in conclusion, the pharmaceutical industry and other areas. Hence, Romanian marine and oceanic research has been greatly expanding. The successes of our institute -- some recent ones were pointed out during this talk -- are proofs in this respect. When stating that it is greatly expanding, of course, I also have in mind the material base available to us, which will increasingly develop in the coming years.

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